IRIS Space Weather Report

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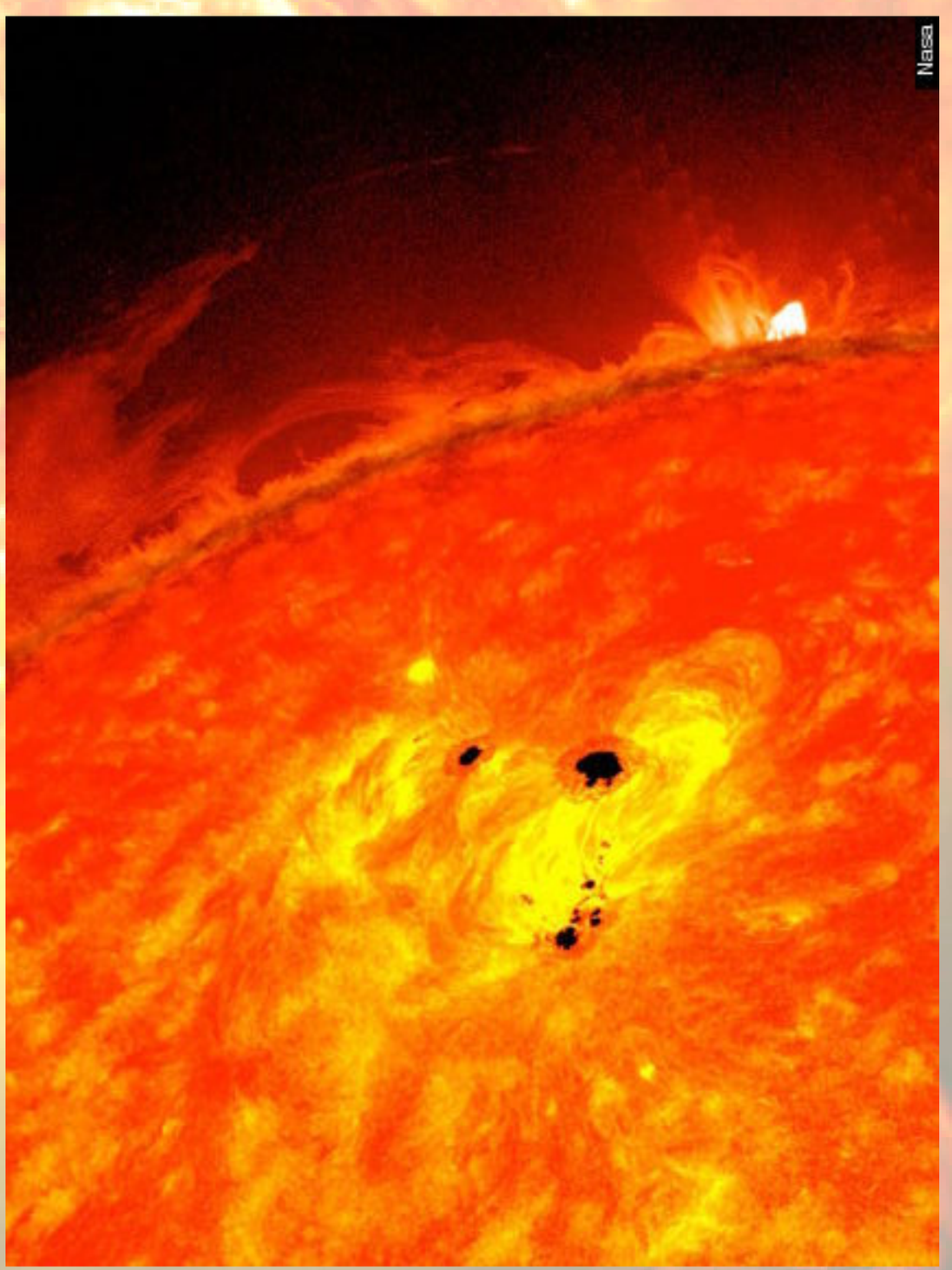
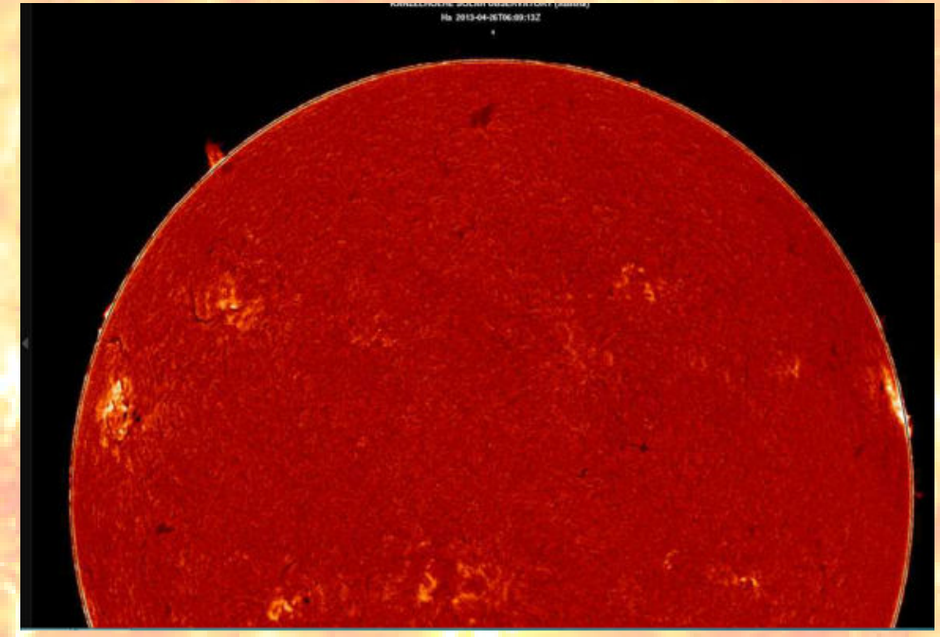
6th Grade

SUNSPOTS REGIONS



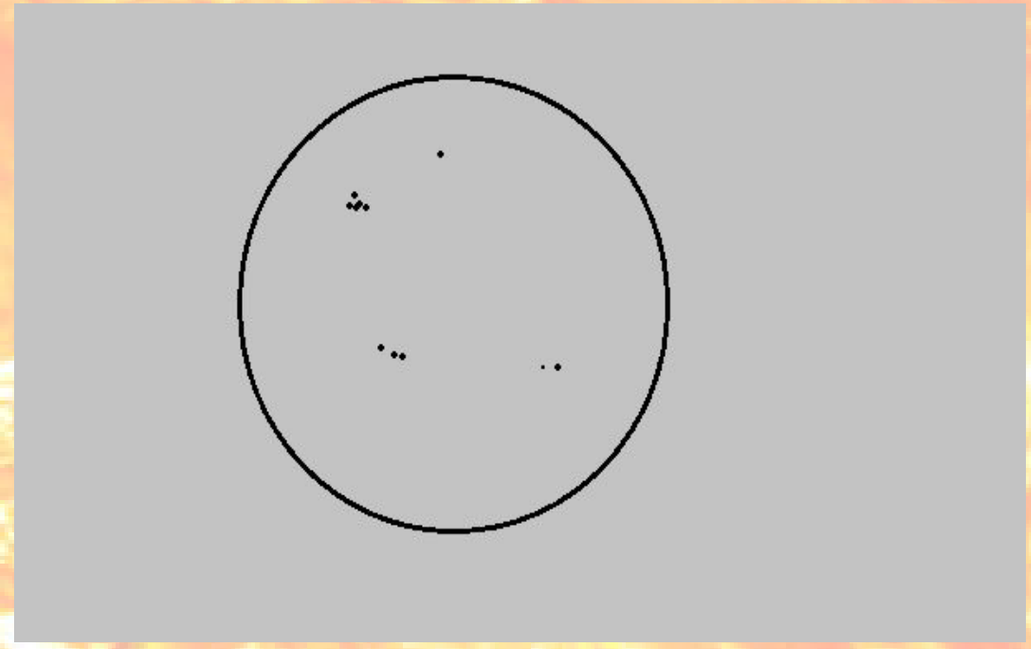
•Many sunspots cover the Sun, but we can see them only with satellites.
•Sunspots are located higher compared to the Sun’s equator.
•There are sunspots larger and smaller than Earth.
•We can see from the image alongside that there is more than one sunspot.

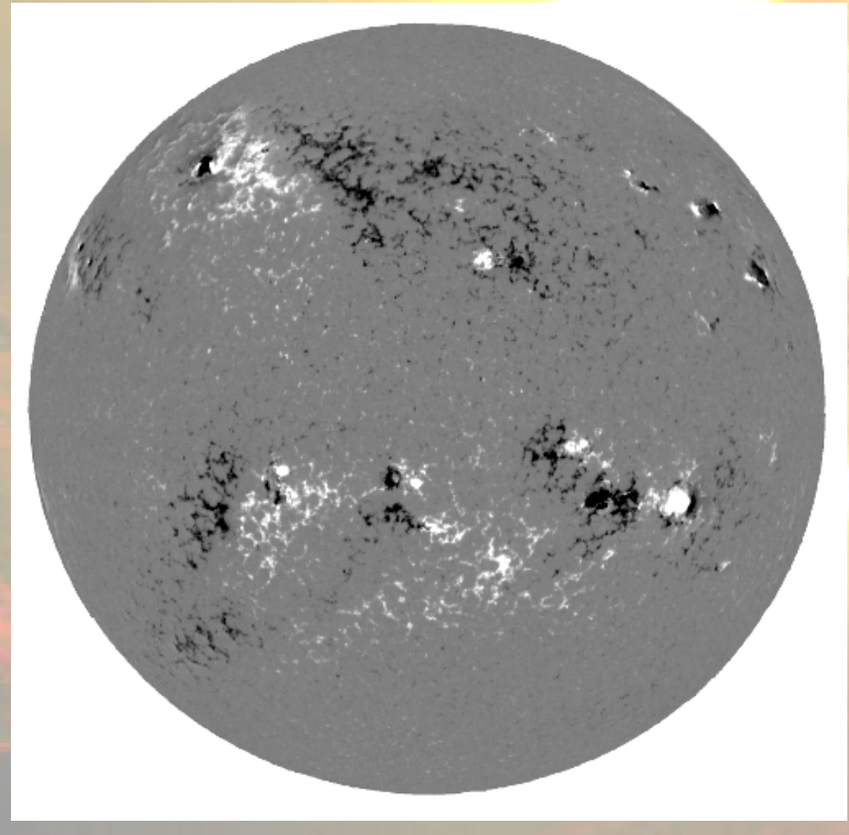


•Analyzing carefully the image, we can observe more than one sunspot.

•As we can see in this, there are clusters of sunspots.

•Here is a representation of the sunspots on the surface of the Sun

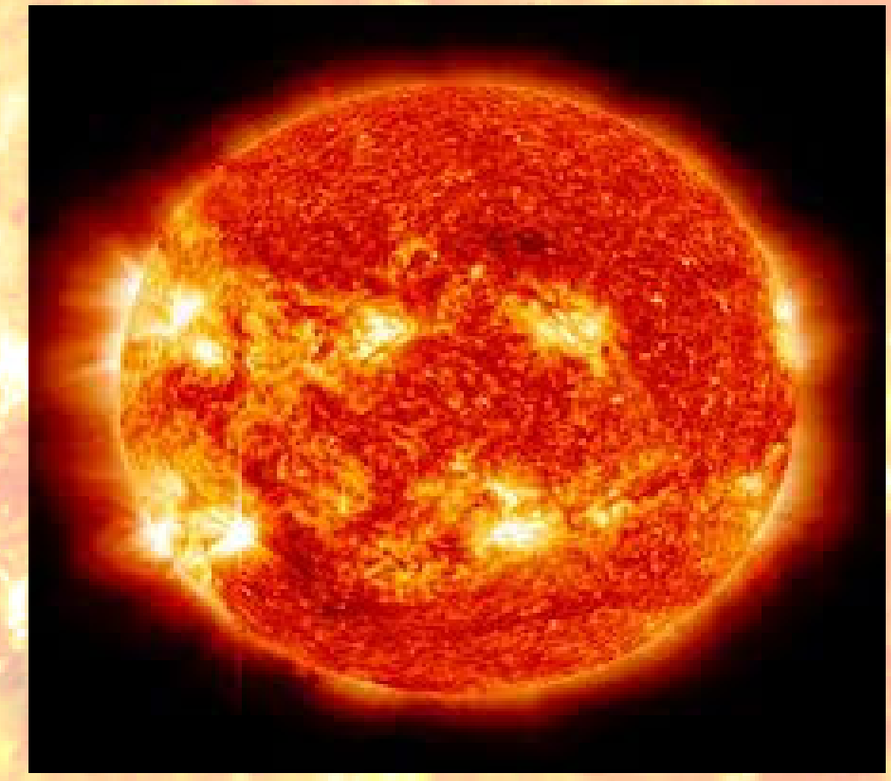


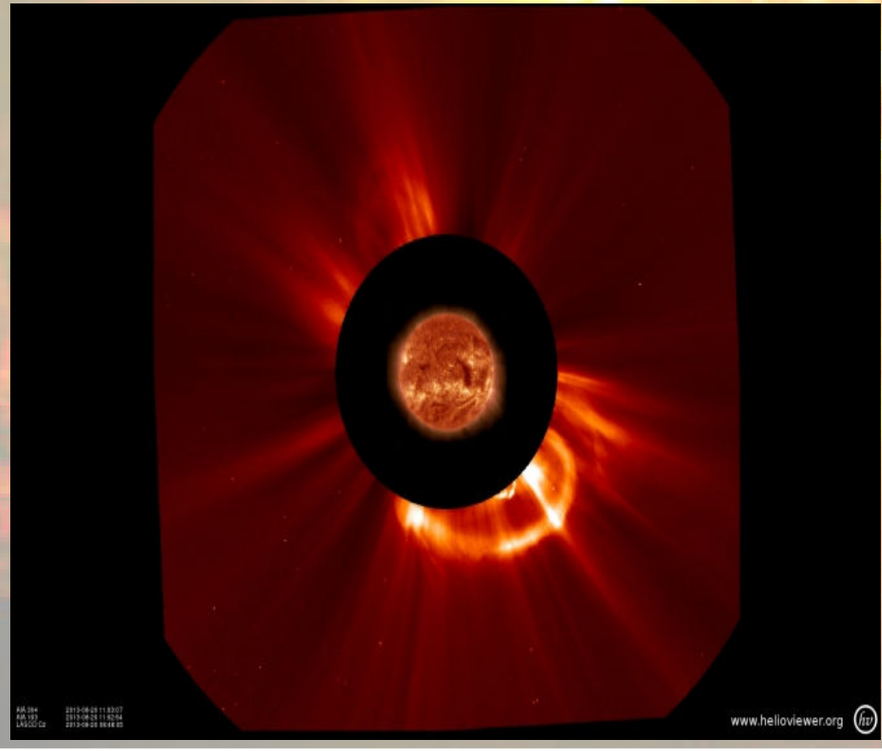


•We can observe black and white areas on the magnetogram (in the imagine above).

•Those areas seem mixed together.

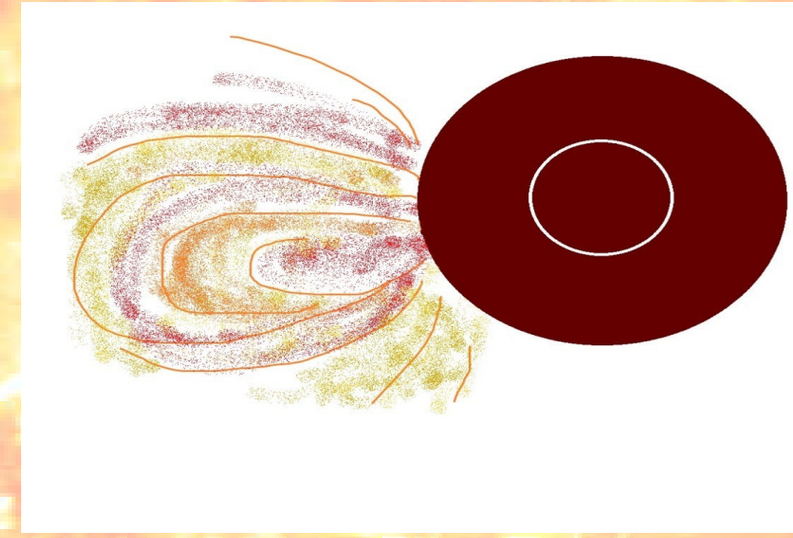
•The sunspots are caused by magnetic activity.
•Also other solar elements occur in magnetic locations.
•Those elements can be found near the sunspots.
•In conclusion, active places occur near the sunspots.
•In the image alongside you can see the phenomenon occuring.





• We can observe CMEs (coronal mass ejection) leaving the Sun (its surface).
•Here is a describing picture.

• Usually, the particles coming from the Sun reach Earth in 1-4 days, as Earth is affected by signal disturbances (all the networks are disturbed).
•Describing image is below.



• We can see a halo effect on the surface of the Sun (like a bubble from the bubble gum you might be chewing), so we can expect a signal disturbance on Earth.
•See the image above.

COMPREHENSION QUESTION

- The sunspot regions in the present day may cause solar storms.

- Their amount and size increase the chances of having a solar storm.

- In the previous images we observed a huge amount of sunspots, so we can expect that sunspot regions are a source of solar storms.

STORM SIGNALS

Were solar flares or coronal mass ejections detected today?

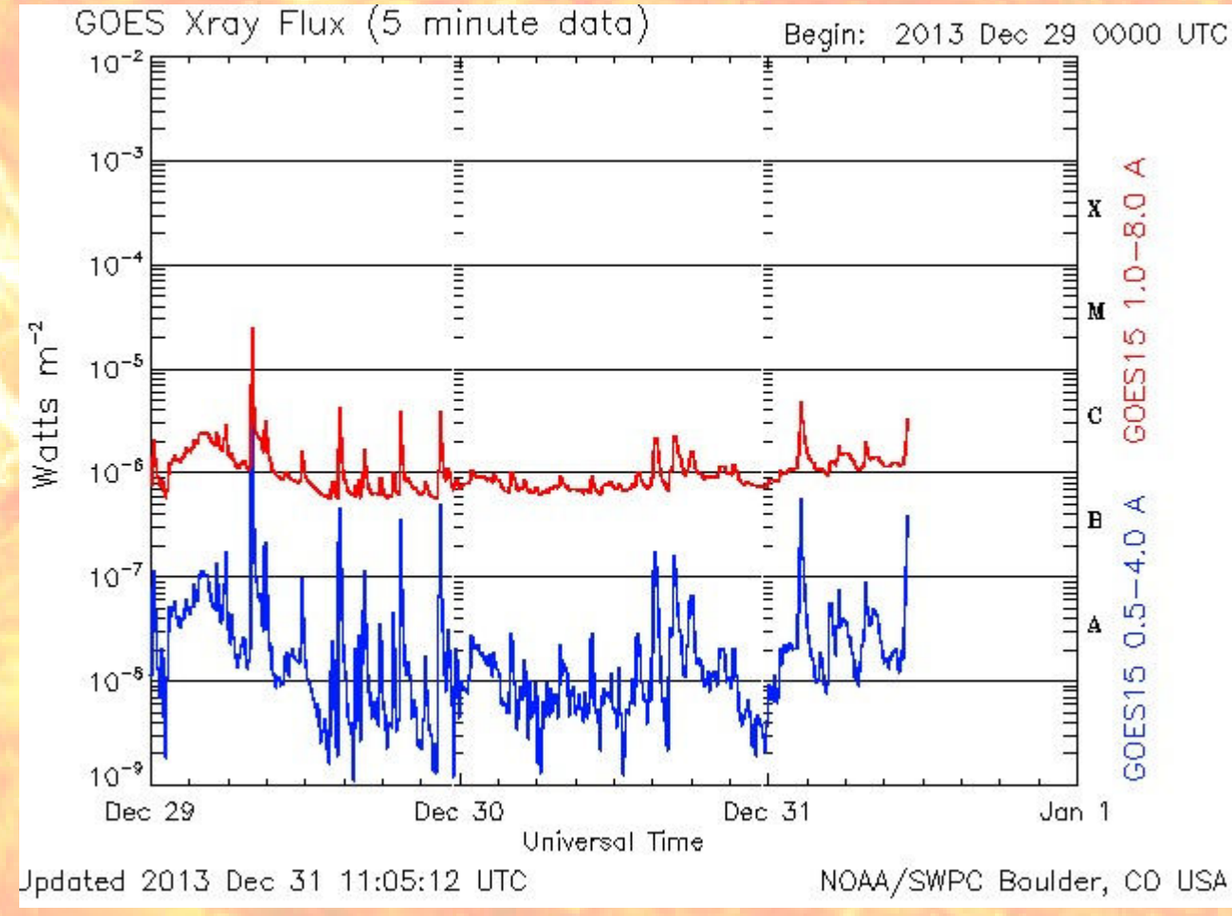
- No, there were no solar flares or coronal mass ejections detected today.

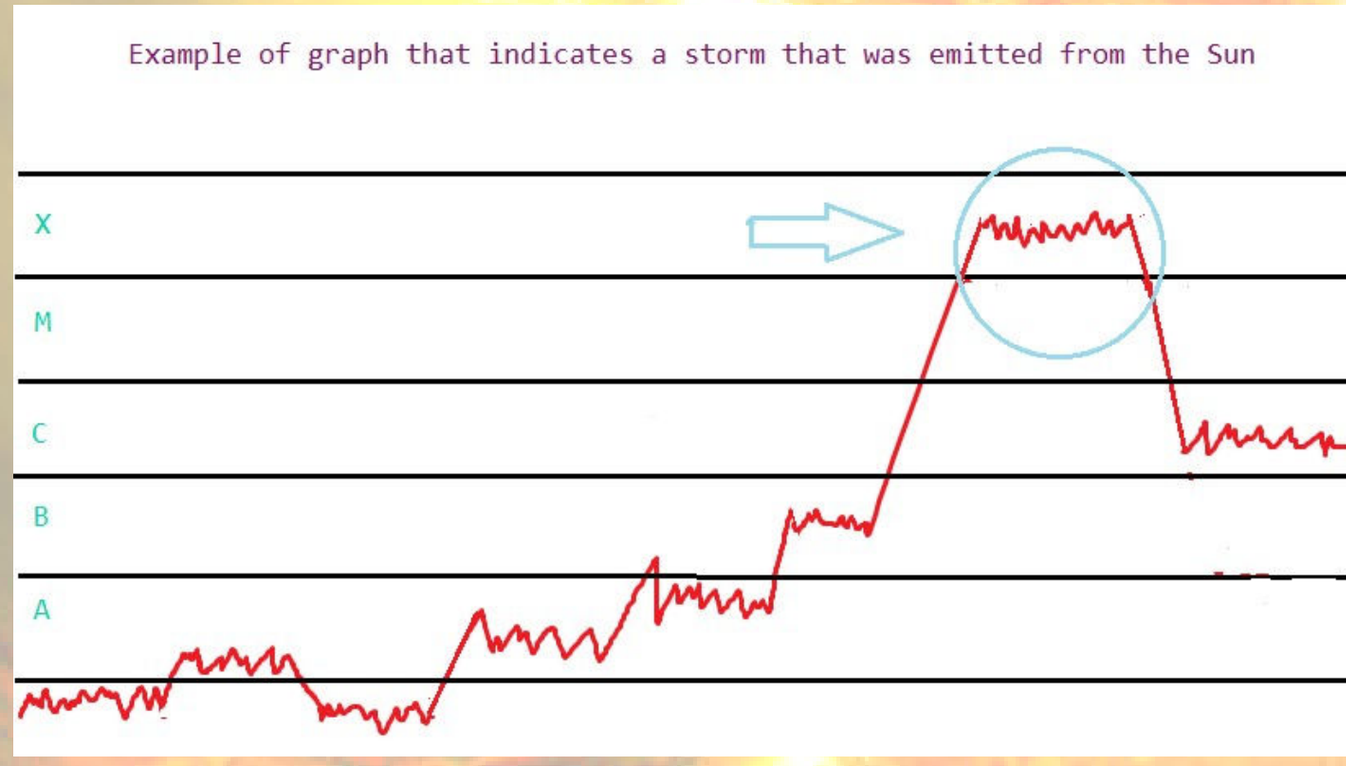
- The radio receivers from Radio JOVE didn't detect any imporatant solar activity for a few months (including December 2013).

December 2013						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Did the intensity of x-ray emissions from the Sun change since your last entry?

The graphic shows that the intensity of X-ray emissions represented by the red line was constant in period between dec 29 and dec 31, 2013.





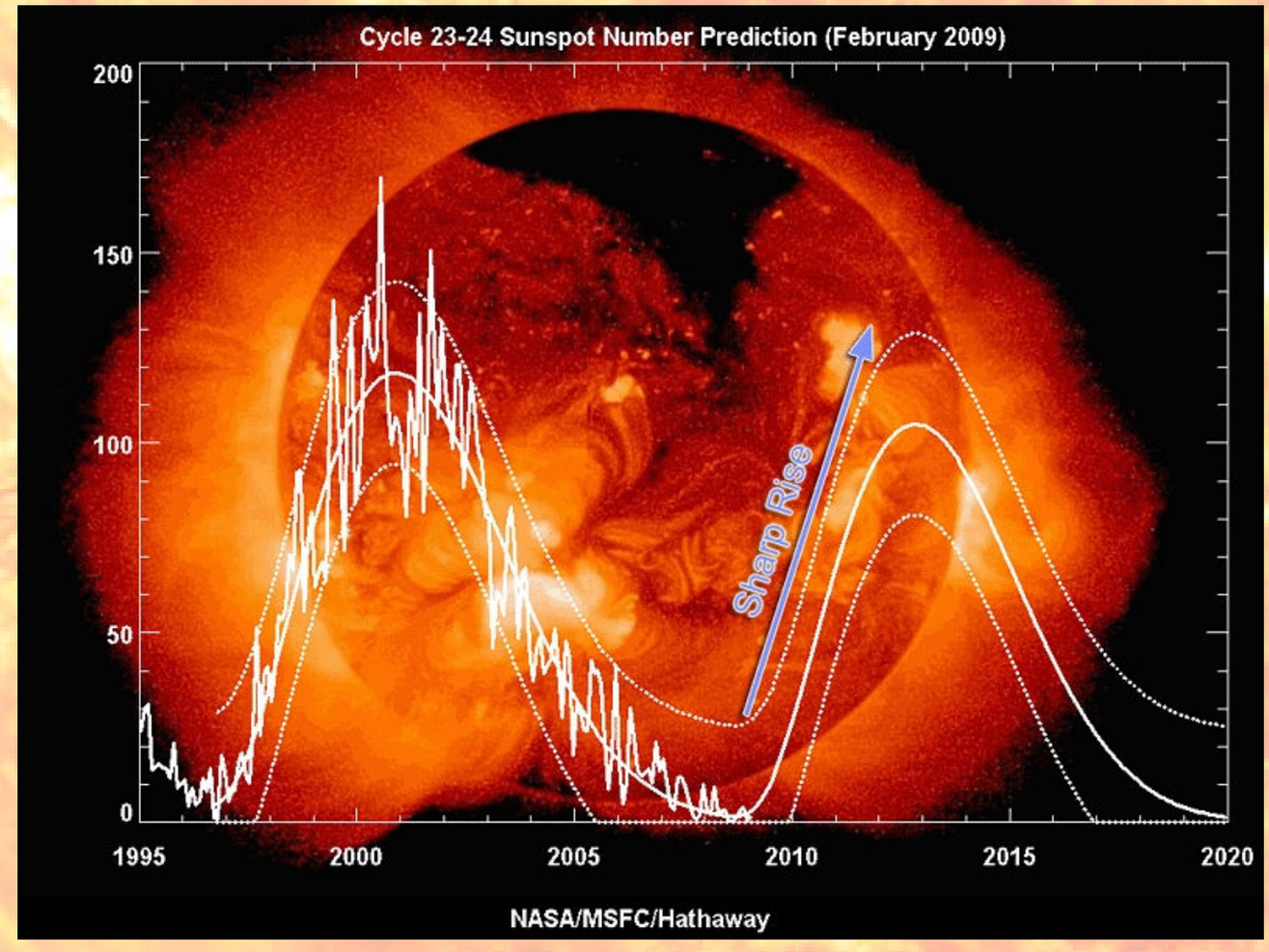
This is an example of the graph that indicates a storm was emitted from the Sun.

Do you think you are observing a solar storm that could affect Earth?

Since the power of X-ray emissions observed in the GOES X-ray Flux graphic was pretty constant, relative small around high B or low C and considering the fact that usually the storms hapen when the X-ray emissions are around M or X, the answer is negative.

Did the intensity of X-ray emissions from the sun increase over the last few days?

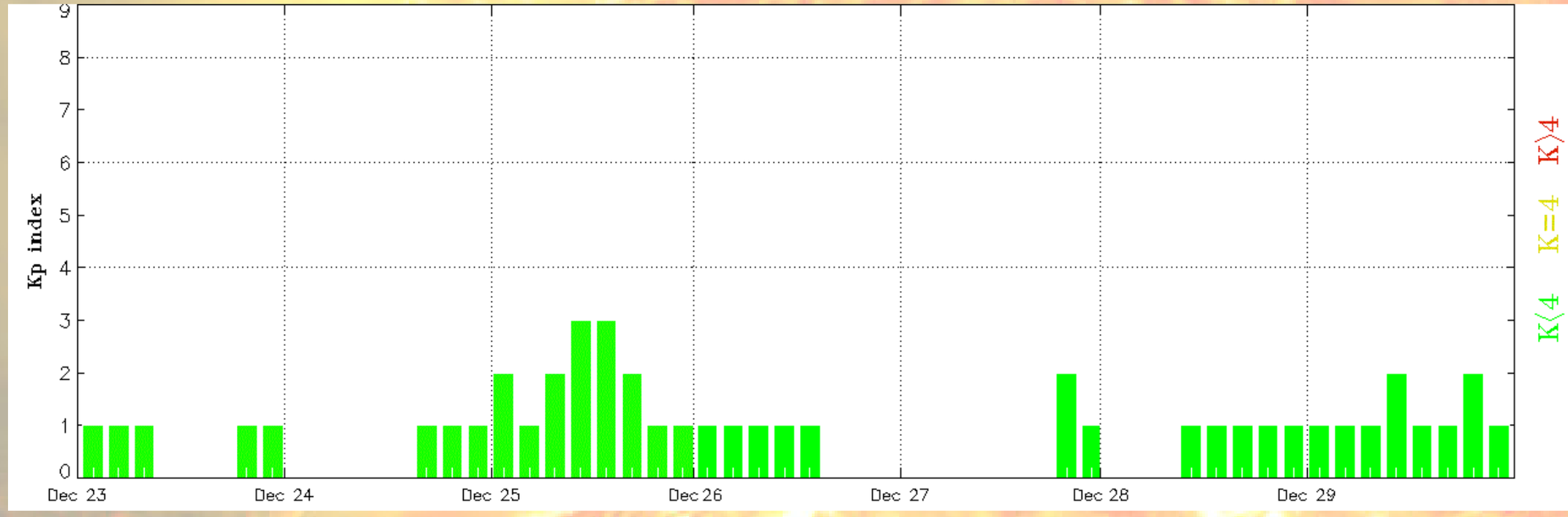
The intensity of X-ray emissions is stady between B and C, so probably the solar storms are going to be weak.



COMPREHENSION QUESTION

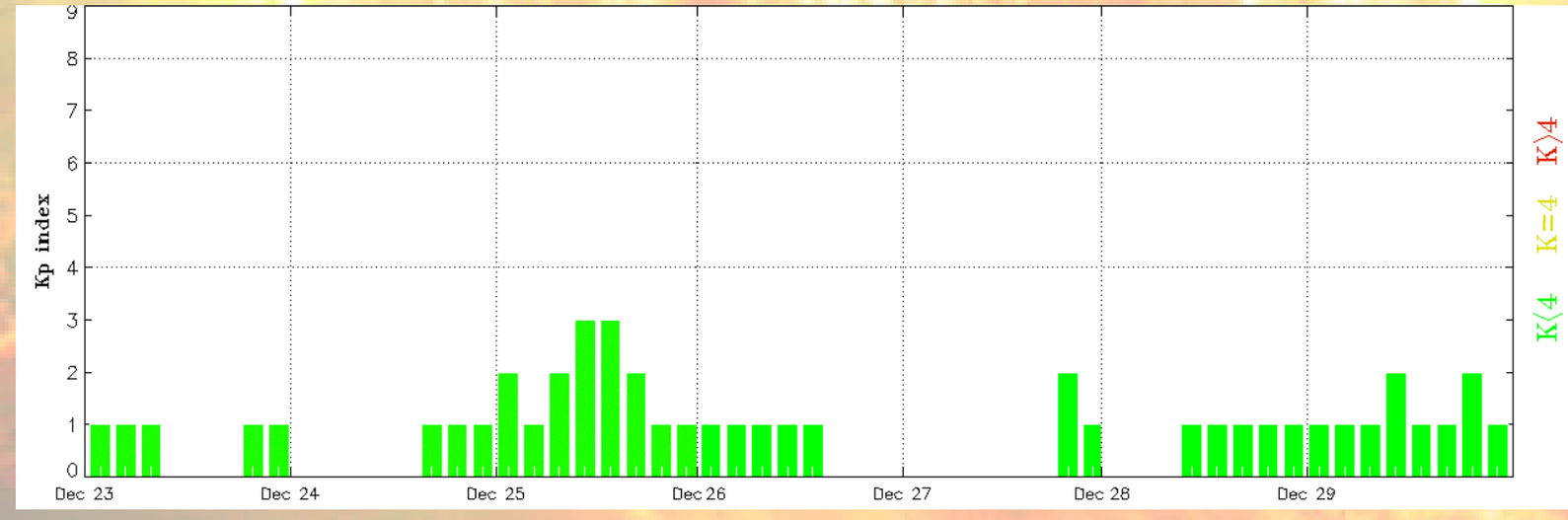
Since the radio receivers from Radio JOVE didn't detect any solar flares or coronal mass ejection today, and the power of the X-rays emissions posted on the GOES X-ray Flux Graphic site was relative low, between B and C levels in the last few days, a solar storm might not be heading towards Earth

MAGNETOSPHERE



As one can observe, our period colected data covers a period of 7 days:
December 23rd, 24th, 25th, 26th, 27th, 28th, 29th 2013.

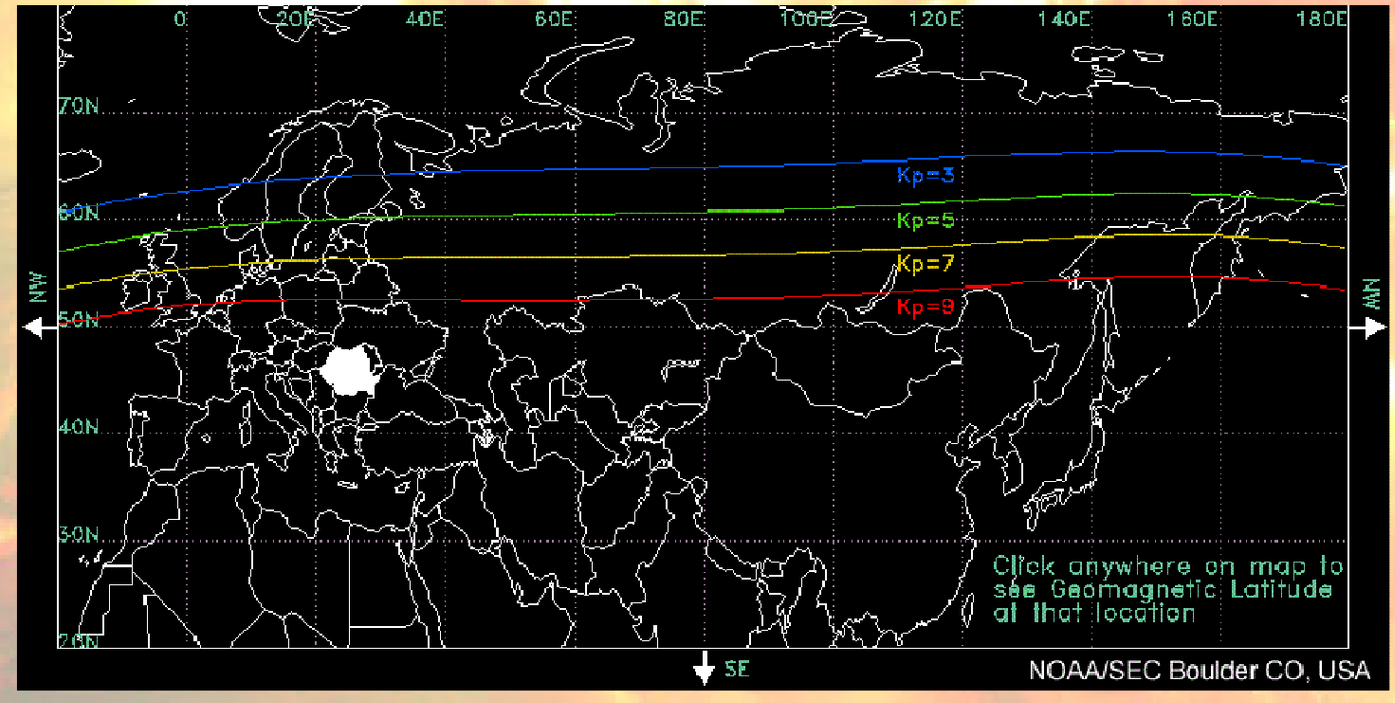
- The highest Kp index levels were:
  - 1 on December, 23rd
  - 1 on December, 24th
  - 3 on December, 25th
  - 1 on December, 26th
  - 2 on December, 27th
  - 1 on December, 28th
  - 2 on December, 29th
- In this period of 7 days the geomagnetic field has been at quiet/unsettled (on the 3rd day) levels.



The previous graph reveals that there weren’t any Kp values of 5 or higher, indicating little magnetic change in the Earth’s magnetic field.

After a careful analyze, we noticed that there weren’t any Kp values of 7 or higher, indicating no large disturbance or severe geomagnetic storm.

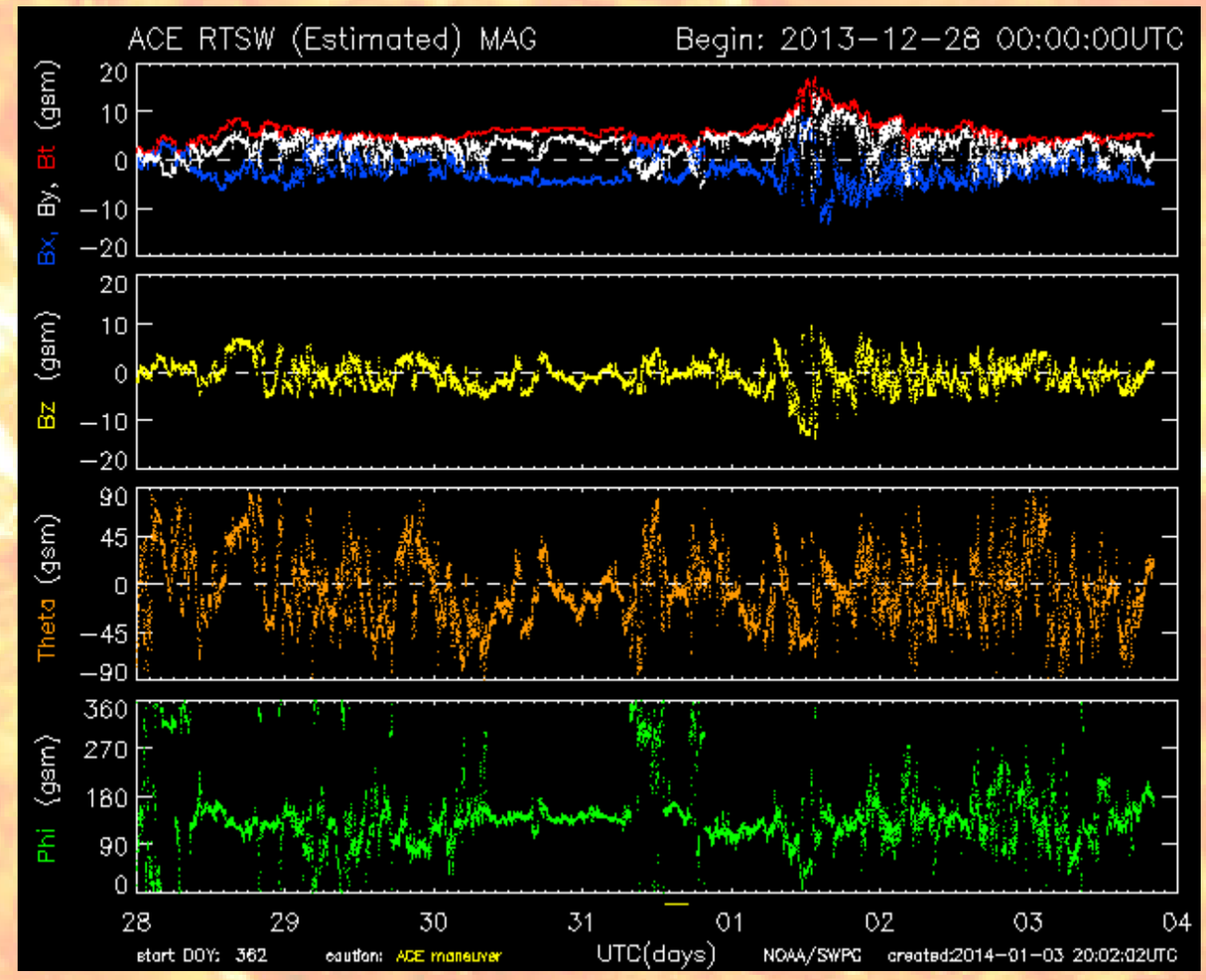
Using the interactive map, we found out that for our country, Romania, the longitude is 25E, latitude 45N and the corrected geomagnetic latitude is 40.



In our area, in order to observe an aurora, the Kp level would have to be 9 or higher, because Romania is a bit too southern for normal auroras (there should be a massive disturbance in order to see an aurora).

Based on the data we colected and analyzed, we can conclud that in the next few days the activity will be low, so only the northern areas (Russia, Alaska, Canada, Iceland and Greenland) will witness auroras.

Analyzing the data in this image, we can notice on the yellow graph (Bz) the values indicating a low geomagnetic storm activity.



From our colected data, we concluded that the last geomagnetic storm arrived at the ACE satellite on December, 29, 2013, time 21:00 (as shown in the picture below).

The Magnetosphere graph shows us that the storm will arrive on Earth in less than one hour (50 min.).

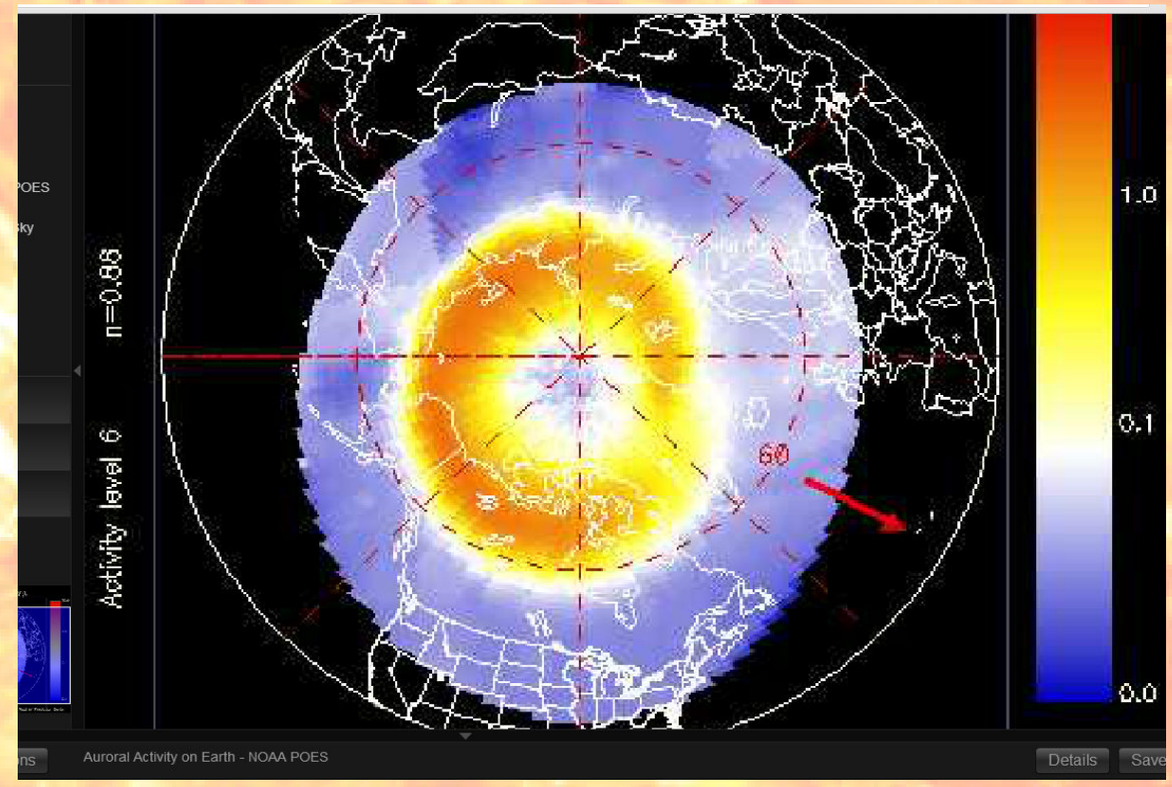
COMPREHENSION QUESTION: if there could be a measurable disturbance in Earth's magnetic field ?

No, there hasn't been any measurable disturbance in the Earth's magnetic field, as the Magnetosphere graph indicates a low level of geomagnetic storm.

AURORAS

(Maybe this picture is not the best choice because of the light pollution!)

From our colected data, we have noticed that the intensity of the storm is intense to moderate at the North Pole and decreases in strength as the radius expands.



The southernmost extent of the auroral activity is in The United States of America , in the states of Missouri and Kansas.

➢ Analyzing our data, we concluded that the last aurora was on 4th of January, in Bayfield, Wiscosin.

➢Our advice is if you want to see the auroras borealis you should go in:

- Finland
- Scandinavia
- Syberia
- Alaska
- Greenland.

➢ In these places you need to go between March and October.

References:

- http://sunearthday.nasa.gov/swac/
- http://sohowww.nascom.nasa.gov/hotshots/2003_10_22/sunspot.gif
- http://zebu.uoregon.edu/~imamura/122/images/sunspots_full_disk.gif http://jovearchive.gsfc.nasa.gov/cgi-bin/calendar/calendar.cgi
- http://www.swpc.noaa.gov/rt_plots/xray_5m.html
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- http://sunearthday.nasa.gov/swac/data.php

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This project was developed by:

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Thank you very much, we hope you like it!